



MONTHLY OPERATIONS REPORT

MOR#039

Reporting period from 16-Feb-2017 to 15-Mar-2017

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1. Summary

In this reporting period, most of the synthesis products were nearly complete. All transfer frame files were received by VITO. Most occurring anomalies having an impact on the data are automatic recoveries of the platform, and minor influences of geometric errors and decompression errors.

There were no major issues with the image quality during this reporting period for the radiometric or geometric quality although a small peak was registered in terms of daily absolute location error between 18 February and 22 February.

In previous reporting period, the reprocessing campaign towards Collection 1 (C1) was completed. All reprocessed PROBA-V data in all spatial resolutions were made available in HDF5 and geoTIFF format via the Product Distribution Facility, including the newly introduced L2A products. On March 1st, all Collection 0 (C0) data were set to unavailable and erased from the online storage. Collection 0 will remain in the archive and is available on demand. The MEP environment also has access to all Collection 1 data.

No new developments or upgrades are expected in the coming period.

2. System Infrastructure

| Category | % Up Time | % Down Time |
|-------------------------|-----------|---------------------|
| Switches | 100.0 | 0.0 |
| Database Servers | 100.0 | 0.0 |
| Mid Term File Servers | 100.0 | 0.0 |
| Short Term File Servers | 100.0 | 0.0 |
| Master Servers | 100.0 | 0.0 |
| Worker Nodes | 97.76 | 2.24 ^(*) |
| PDF | 100.0 | 0.0 |

Table 1: System Infrastructure availability for this reporting period

(*) Worker nodes: Pnode 7 was 100% down due to hardware failure (will be replaced)



3. Image Processing Services

3.1. Ingested and archived products

| Product Type | Total | Received | Missing data, ingested by VITO | Archived |
|--------------|-------|----------|--------------------------------|----------|
| METEO | 236 | 236 | 0 | 236 |
| TFF | 280 | 279 | 1 ^(*) | 279 |

Table 2: Ingested and archived products for this reporting period

(*) 1 x missing TFF: TFF 12575 – No VC4 data

3.2. Generated and archived products

| Product Type | Total | Processed | Error | Archived |
|-----------------------------|-------|-----------|------------------|----------|
| PROBAV_L1A - Calibration | 237 | 237 | 0 | 237 |
| PROBAV_L1A - Nominal | 2372 | 2371 | 1 ^(*) | 2372 |
| PROBAV_L1C | 2371 | 2371 | 0 | 2371 |
| PROBAV_L3_S1_TOA_100M | 28 | 28 | 0 | 28 |
| PROBAV_L3_S1_TOC_100M | 28 | 28 | 0 | 28 |
| PROBAV_L3_S1_TOC_NDVI_100M | 28 | 28 | 0 | 28 |
| PROBAV_L3_S5_TOA_100M | 6 | 6 | 0 | 6 |
| PROBAV_L3_S5_TOC_100M | 6 | 6 | 0 | 6 |
| PROBAV_L3_S5_TOC_NDVI_100M | 6 | 6 | 0 | 6 |
| PROBAV_L3_S1_TOA_300M | 28 | 28 | 0 | 28 |
| PROBAV_L3_S1_TOC_300M | 28 | 28 | 0 | 28 |
| PROBAV_L3_S10_TOC_300M | 3 | 3 | 0 | 3 |
| PROBAV_L3_S10_TOC_NDVI_300M | 3 | 3 | 0 | 3 |
| PROBAV_L3_S1_TOA_1KM | 28 | 28 | 0 | 28 |
| PROBAV_L3_S1_TOC_1KM | 28 | 28 | 0 | 28 |
| PROBAV_L3_S10_TOC_1KM | 3 | 3 | 0 | 3 |
| PROBAV_L3_S10_TOC_NDVI_1KM | 3 | 3 | 0 | 3 |

Table 3: Generated and archived products for this reporting period

(*) 1x L1A Error: Error Geometric processing

3.3. Backup and archiving service

| Product type | Total Files | Total File Size (GB) |
|------------------------------|-------------|----------------------|
| TFF | 273 | 725.17 |
| L1A | 2530 | 1286.57 |
| Database transaction logs | 1924 | 209.92 |
| Database incremental back-up | 50 | 19.17 |
| Database full back-up | 27 | 2285.47 |

Table 4: Back-up data volumes for this reporting period

| Product type | Total Files | Total File Size (GB) |
|-----------------------------|-------------|----------------------|
| PROBAV_TRANSFERFRAMES | 253 | 722.73 |
| PROBAV_L1A | 2375 | 1293.30 |
| PROBAV_L1C | 2156 | 2551.60 |
| PROBAV_L3_S1_TOA_100M | 207 | 5864.36 |
| PROBAV_L3_S1_TOC_100M | 214 | 6035.12 |
| PROBAV_L3_S1_TOC_NDVI_100M | 280 | 850.95 |
| PROBAV_L3_S5_TOA_100M | 32 | 3287.83 |
| PROBAV_L3_S5_TOC_100M | 38 | 3882.85 |
| PROBAV_L3_S5_TOC_NDVI_100M | 42 | 483.98 |
| PROBAV_L3_S1_TOA_300M | 280 | 3464.38 |
| PROBAV_L3_S1_TOC_300M | 229 | 2837.40 |
| PROBAV_L3_S10_TOC_300M | 23 | 441.09 |
| PROBAV_L3_S10_TOC_NDVI_300M | 30 | 51.98 |
| PROBAV_L3_S1_TOA_1KM | 208 | 322.00 |
| PROBAV_L3_S1_TOC_1KM | 221 | 340.33 |
| PROBAV_L3_S10_TOC_1KM | 28 | 68.39 |
| PROBAV_L3_S10_TOC_NDVI_1KM | 32 | 6.57 |
| ICP_GEOMETRIC_CENTRE | 0 | 0 |
| ICP_GEOMETRIC_LEFT | 0 | 0 |
| ICP_GEOMETRIC_RIGHT | 0 | 0 |
| ICP_RADIOMETRIC_CENTRE | 2 | 0.08 |
| ICP_RADIOMETRIC_LEFT | 2 | 0.08 |
| ICP_RADIOMETRIC_RIGHT | 2 | 0.08 |
| METEO_ECMWF | 204 | 0.25 |
| METEO_METEOSERVICES | 216 | 1.15 |
| POLARMOTION | 1 | 0.00 |

Table 5: Archived data volumes for this reporting period

3.4. Dissemination service

| Product type | Added to catalogue | Ordered | Delivered |
|-----------------------------|--------------------|---------|-----------|
| PROBAV_L1C | 2369 | 74 | 76 |
| PROBAV_L3_S1_TOA_100M | 28 | 51 | 59 |
| PROBAV_L3_S1_TOC_100M | 29 | 6767 | 5224 |
| PROBAV_L3_S1_TOC_NDVI_100M | 28 | 2782 | 2255 |
| PROBAV_L3_S5_TOA_100M | 6 | 23 | 24 |
| PROBAV_L3_S5_TOC_100M | 6 | 667 | 671 |
| PROBAV_L3_S5_TOC_NDVI_100M | 6 | 997 | 1610 |
| PROBAV_L3_S1_TOA_300M | 28 | 120 | 121 |
| PROBAV_L3_S1_TOC_300M | 29 | 197 | 1575 |
| PROBAV_L3_S10_TOC_300M | 3 | 170 | 166 |
| PROBAV_L3_S10_TOC_NDVI_300M | 3 | 130 | 278 |
| PROBAV_L3_S1_TOA_1KM | 28 | 114 | 117 |
| PROBAV_L3_S1_TOC_1KM | 28 | 171 | 1282 |
| PROBAV_L3_S10_TOC_1KM | 3 | 77 | 87 |
| PROBAV_L3_S10_TOC_NDVI_1KM | 3 | 774 | 803 |

Table 6: Ordered and delivered products for this reporting period

3.5. End-user activity

17 new user(s) were registered in this reporting period.

The total number of users registered for PROBA-V data and that have ordered data is **1064**; with **105** different nationalities representing **818** different companies/universities.

| Product type | Africa | Asia | Europe | N-America | Oceania | S-America |
|-----------------------------|--------|---------|---------|-----------|---------|-----------|
| PROBAV_L1C | 0 | 0 | 164.07 | 0 | 0 | 0 |
| PROBAV_L3_S1_TOA_100M | 0.85 | 89.79 | 52.22 | 0 | 0 | 0 |
| PROBAV_L3_S1_TOC_100M | 0 | 2732.72 | 1138.88 | 1276.48 | 0 | 0 |
| PROBAV_L3_S1_TOC_NDVI_100M | 20.83 | 24.69 | 0.06 | 0 | 0 | 0 |
| PROBAV_L3_S5_TOA_100M | 0 | 370.66 | 1.31 | 0 | 0 | 0.00 |
| PROBAV_L3_S5_TOC_100M | 33.32 | 1.80 | 610.19 | 356.96 | 0 | 0 |
| PROBAV_L3_S5_TOC_NDVI_100M | 23.70 | 13.38 | 16.11 | 527.71 | 0 | 0.89 |
| PROBAV_L3_S1_TOA_300M | 0 | 0.47 | 918.40 | 0 | 0 | 0 |
| PROBAV_L3_S1_TOC_300M | 0 | 0.10 | 7663.08 | 554.02 | 0 | 0 |
| PROBAV_L3_S10_TOC_300M | 3.95 | 54.74 | 203.08 | 0 | 0 | 0 |
| PROBAV_L3_S10_TOC_NDVI_300M | 0 | 2.07 | 0.08 | 0 | 0 | 0.03 |
| PROBAV_L3_S1_TOA_1KM | 0 | 0 | 133.76 | 0 | 0 | 0 |

| | | | | | | |
|----------------------------|------|-------|---------|------|------|------|
| PROBAV_L3_S1_TOC_1KM | 0.00 | 0 | 1366.87 | 0 | 0.00 | 0 |
| PROBAV_L3_S10_TOC_1KM | 8.20 | 0.00 | 30.14 | 0.88 | 0 | 0 |
| PROBAV_L3_S10_TOC_NDVI_1KM | 3.72 | 30.57 | 1.81 | 0 | 0 | 0.01 |

Table 7: Data download (GB) in total per Origin of the User for the reporting period

| Product Type | Global |
|-----------------------------|---------|
| L1C | 164.07 |
| PROBAV_L3_S1_TOA_100M | 142.86 |
| PROBAV_L3_S1_TOC_100M | 5148.08 |
| PROBAV_L3_S1_TOC_NDVI_100M | 45.57 |
| PROBAV_L3_S5_TOA_100M | 371.97 |
| PROBAV_L3_S5_TOC_100M | 1002.27 |
| PROBAV_L3_S5_TOC_NDVI_100M | 581.79 |
| PROBAV_L3_S1_TOA_300M | 918.87 |
| PROBAV_L3_S1_TOC_300M | 8217.20 |
| PROBAV_L3_S10_TOC_300M | 261.76 |
| PROBAV_L3_S10_TOC_NDVI_300M | 2.18 |
| PROBAV_L3_S1_TOA_1KM | 133.76 |
| PROBAV_L3_S1_TOC_1KM | 1366.87 |
| PROBAV_L3_S10_TOC_1KM | 39.23 |
| PROBAV_L3_S10_TOC_NDVI_1KM | 36.11 |

Table 8: Data download (GB) in total for the reporting period

| Company | # Downloads |
|-----------------------------|-------------|
| UCLOUVAIN | 1924 |
| BEIJING FORESTRY UNIVERSITY | 1661 |
| IKI-RAS | 1589 |
| SPACE RESEARCH INSTITUTE | 1093 |
| KSU | 956 |
| ZRC | 923 |
| SASSCAL | 860 |
| UNESCO-IHE | 798 |
| VITO | 783 |
| GOOGLE | 537 |

Table 9: Top 10 user companies for the reporting period

| Country | # Users |
|----------------|---------|
| CHINA | 106 |
| BELGIUM | 93 |
| ITALY | 56 |
| FRANCE | 55 |
| UNITED STATES | 48 |
| BRAZIL | 47 |
| UNITED KINGDOM | 43 |
| INDIA | 39 |
| NETHERLANDS | 35 |
| GERMANY | 35 |

Table 10: Top 10 countries with most registered users

List of issues raised by users:

- Re: Proba-V
- your PROBA-V orders
- PDF: N.A. - srikanta sannigrahi - 2017/3/10
- Use of PROBA-V files tile X17Y03 S1 daily TOC
- cannot access to ftp download using PDF portal users
- Free VGT
- ask for your help, thanks !
- Products of order "C0162011" are available
- need to download data
- temporal average cloud cover map
- Subscription process
- PROBA-V Mission Exploitation Platform - Extension of PV MEP VM
- n-daily mean compositing for 100m
- Download remaining files

4. Image Calibration services

4.1. Radiometric Calibration

| Calibration request type | Total | Processed | Not received | Error |
|--------------------------|-------|-----------|--------------|-------|
| CLOUDS | 13 | 13 | 0 | 0 |
| DARK CURRENT | 17 | 17 | 0 | 0 |
| MOON | 2 | 2 | 0 | 0 |
| RAYLEIGH | 37 | 36 | 1 | 0 |
| SNOW | 15 | 15 | 0 | 0 |
| SUN_GLINT | 0 | 0 | 0 | 0 |

Table 11: Calibration Image requests for this reporting period

| Calibration image type | Total | Valid | Invalid ^(*) |
|---------------------------|-------|-------|------------------------|
| PROBA_V_L1A_CALIBRATION | 2 | 2 | 0 |
| PROBA-V_L1B_CALIBRATION | 235 | 217 | 18 |
| PROBA-V_L1B_INTERSECTION | 713 | 372 | 312 |
| PROBA-V_L1B_OVERLAPREGION | 0 | 0 | 0 |

Table 12: Processed calibration images for this reporting period

(*) Due to insufficient overlap with the calibration region of interest, not enough pixels (e.g. clouds contamination), site not sufficiently uniform (illumination), etc.

Long-term monthly Libya-4 mean plots for different cameras are given in Figure 1, Figure 2 and Figure 3. Deep convective clouds interband calibration results are given in Figure 4.

Please note that reporting is now done for collection 1.

The DCC interband calibration results for LEFT and CENTER BLUE still show a decrease. This decrease is also confirmed by the Libya-4 and Moon results. A degradation model (starting on April 1) will now be implemented for the LEFT and CENTER BLUE absolute calibration coefficient.

Radiometric ICP file

Both the SWIR and BLUE LEFT/CENTER absolute calibration coefficients will be updated following a linear degradation model. Furthermore the dark currents will be updated.

The current ICP files are

- PROBAV_ICP_RADIOMETRIC#LEFT_20170301_V01
- PROBAV_ICP_RADIOMETRIC#CENTER_20170301_V01
- PROBAV_ICP_RADIOMETRIC#RIGHT_20170301_V01

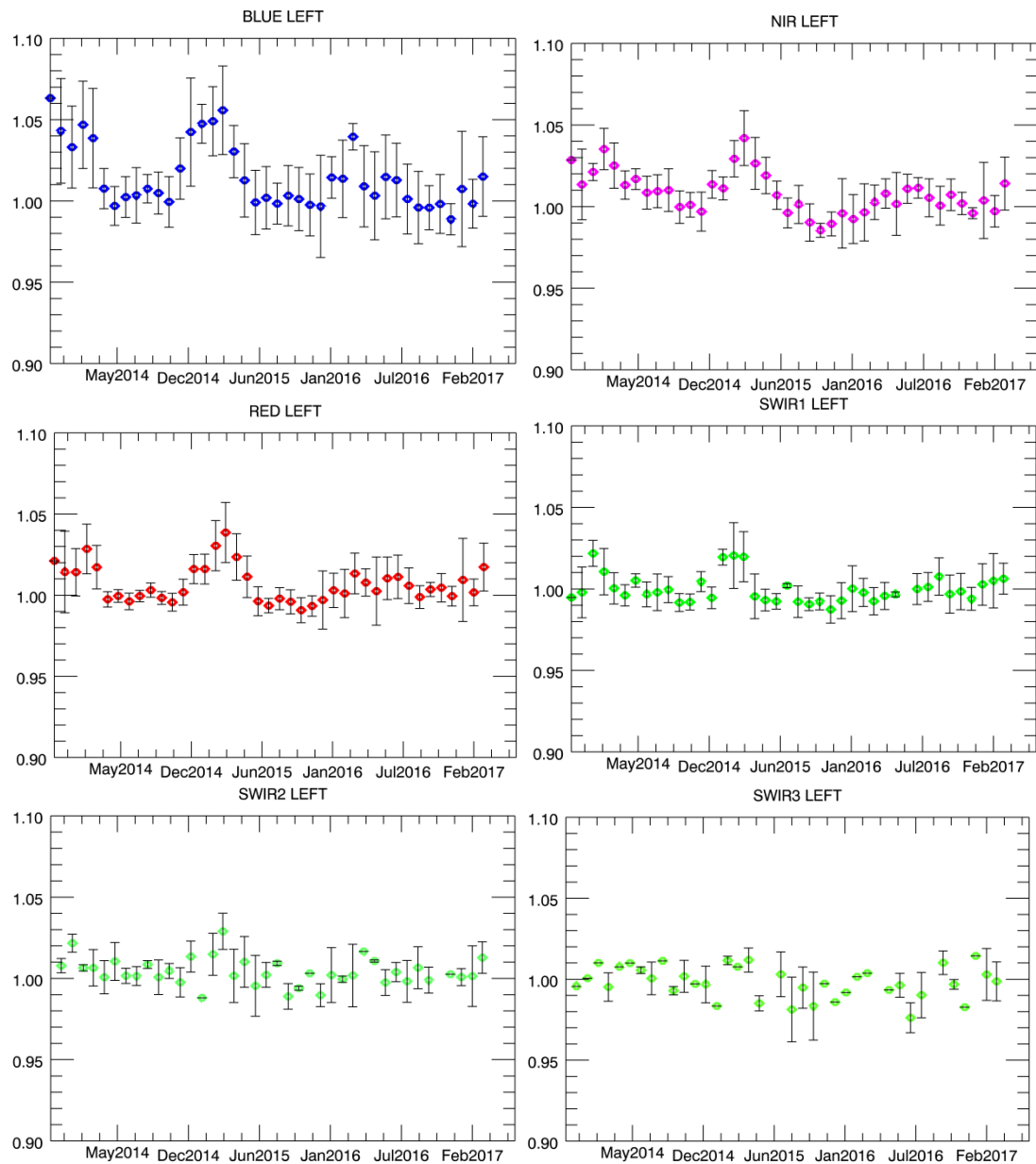


Figure 1. Libya-4 desert calibration results: LEFT monthly averaged results (collection 1)

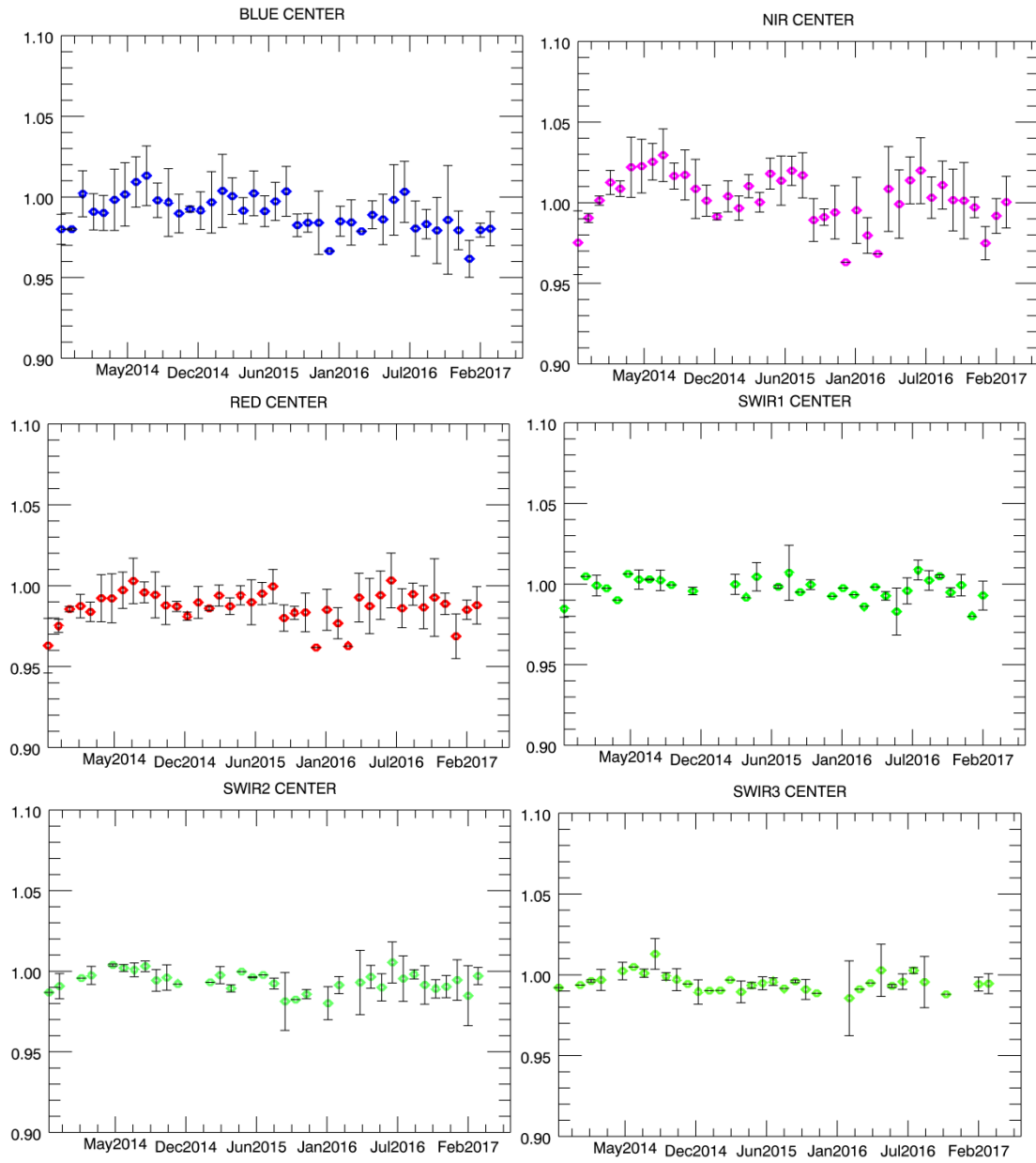


Figure 2. Libya-4 desert calibration results: CENTER monthly averaged results (collection 1)

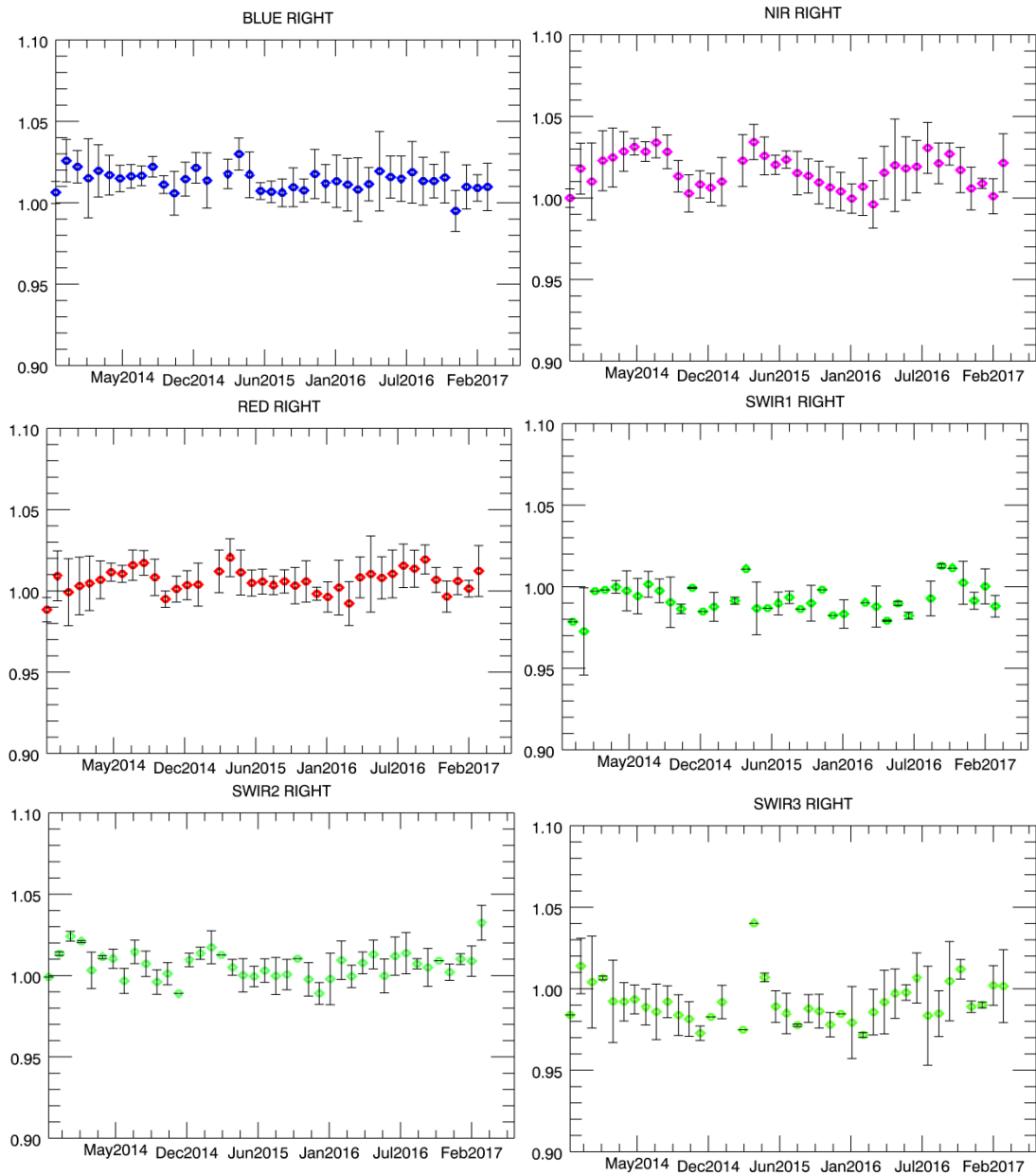


Figure 3. Libya-4 desert calibration results: RIGHT monthly averaged results (collection 1)

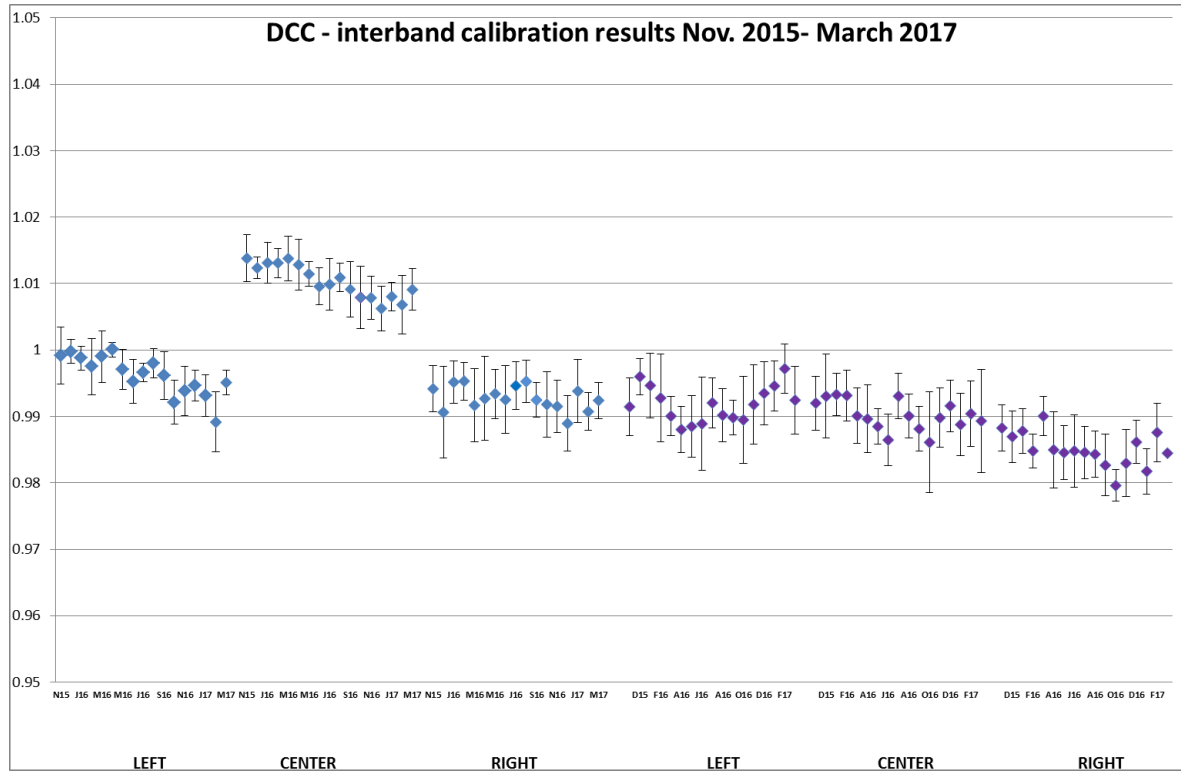


Figure 4. DCC inter-band calibration results: LEFT, CENTER and RIGHT camera (collection 1)

4.2. Geometric Calibration

| Calibration image type | Total | Processed | Error |
|--------------------------|-------|-----------|-------|
| PROBA-V_L1C_INTERSECTION | 12895 | 12895 | 0 |

Table13: Processed calibration images for this reporting period

During previous month, the average ALE was < 89 m ($\sigma < 97$ m). Daily values increased to a peak of 104 – 110 m on 18/2, followed by a secondary peak of 94 – 104 m on 22/2. After this second peak the ALE rapidly decreased to a minimum with values of 65 – 71 m on 26/2. From 27/2 until the end of the reporting period, the ALE gradually increased to maxima of 93 – 100 m on 5/3, followed by a decrease towards values between 66 m and 73 m on 15/3.

The geometric accuracy was within the requirement of < 300 m, with an average compliance for all cameras of 99.0%. (98.5% - 99.7% from BLUE to SWIR). Daily values showed the regular fluctuations corresponding with the ALE minima and maxima, with no severe outliers.

Geometric ICP file

- PROBAV_ICP_GEOMETRIC#LEFT_20160907_V01
- PROBAV_ICP_GEOMETRIC#CENTER_20160907_V01
- PROBAV_ICP_GEOMETRIC#RIGHT_20160907_V01

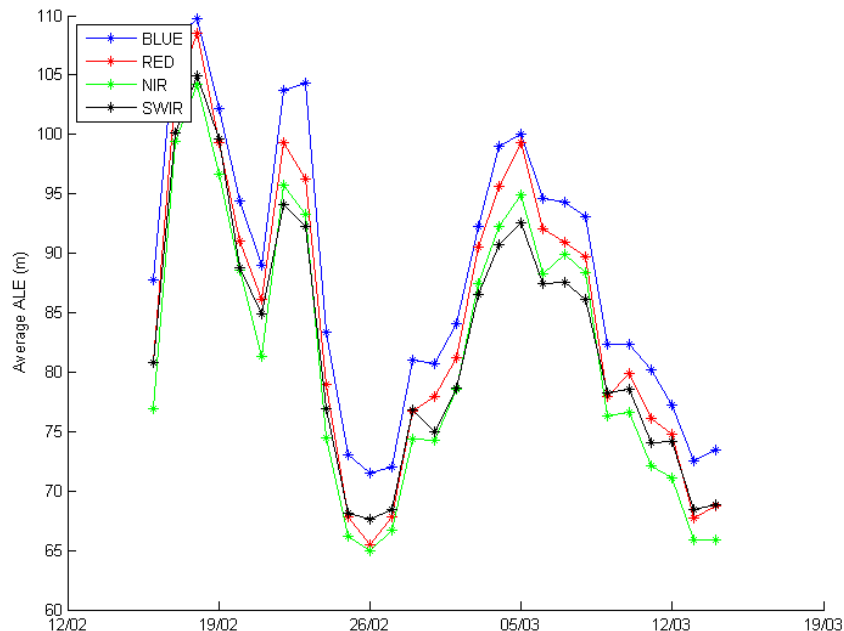


Figure 5 - Daily ALE evolution for all PROBA-V spectral bands for 16/2/2017 – 15/3/2017

5. Anomalies

5.1. System related issues

A detailed description of each issue is available in the issue tracking system <http://jira.vgt.vito.be>

| Key | Summary | Status | Created | Component/s |
|-----------------------------|---|----------|------------|-------------|
| PROBAVUS-7 | Very small images fail to process | Resolved | 10/01/2014 | General |
| PROBAVUS-63 | Cloud shadow detection at high solar zenith angles not working properly | Open | 11/05/2016 | Software |
| PROBAVUS-65 | Processing statuses L2 products | Open | 16/09/2016 | Software |
| PROBAVUS-66 | Cloud cover percentages on PDF products are not reliable | Open | 19/10/2016 | Software |
| PROBAVUS-67 | PDF customisation.exe: L2 geotiff bands are not grouped | Closed | 25/11/2016 | Software |

- 0 new issues were logged during this reporting period
- 1 issue(s) was resolved and closed during this reporting period
- 0 issues are resolved but remain to be closed formally
- 1 issue are resolved but remain in the list logging purposes
- 3 issue(s) is open and remain to be solved

5.2. Image processing issues

No specific processing issues came up in the past month. Most gaps in the data are due to automatic recoveries of the platform, missing TFF data, or decompression errors.

A detailed description of each issue is available in the Weekly Report and the image processing tracking system <https://juniper.vgt.vito.be/ciptools>

The below table gives an overview of the S1's of this reporting period:

| | # S1 | Dates |
|--|------|--|
| Major Gaps (> 21600 km ² (missing TFF)) | 1 | 21/02 |
| Large Gaps (< 21600 km ²) | 0 | |
| Medium Gaps (< 10000 km ²) | 0 | |
| Minor Gaps (< 3600 km ²) | 5 | 12/03, 10/03, 05/03, 11/03, 06/03 |
| Negligible Gaps (< 1000 km ²) | 22 | 25/02, 20/02, 02/03, 07/03, 13/03, 24/02, 01/03, 19/02, 15/03, 18/02, 28/02, 23/02, 08/03, 16/02, 03/03, 26/02, 27/02, 09/03, 14/03, 04/03, 22/02, 17/02 |
| Complete synthesis (no gaps) | 0 | |

Table14: Overview of S1 for this reporting period

| Synthesis | Missing | Decom. Error | Geom. Error | Missing TFF | Autom. Recovery | VC4 Missing | Create Contours | Other |
|-----------|---------|--------------|-------------|-------------|-----------------|-------------|-----------------|-------|
| 20170216 | 0.45% | 1 | 24 | | | | | |
| 20170217 | 0.21% | | 29 | | | | | |
| 20170218 | 0.12% | | 21 | | | | | |
| 20170219 | 0.11% | | 17 | | | | | |
| 20170220 | 0.08% | | 14 | | | | | |
| 20170221 | 8.39% | 3 | 7 | | | 1 | | 1 |
| 20170222 | 0.05% | | 4 | | | | | |
| 20170223 | 0.64% | | 15 | | | | | |
| 20170224 | 0.06% | 2 | 9 | | | | | |
| 20170225 | 0.00% | | 1 | | | | | |
| 20170226 | 0.03% | 2 | 4 | | | | | |
| 20170227 | 0.01% | 1 | 6 | | | | | |
| 20170228 | 0.03% | 1 | 8 | | 1 | | | |
| 20170301 | 2.15% | 3 | 8 | | | | | |
| 20170302 | 0.88% | | 3 | | | | | |
| 20170303 | 0.22% | | 2 | | | | | |
| 20170304 | 0.84% | 1 | 9 | | | | | |
| 20170305 | 0.10% | 3 | 4 | | 1 | | 1 | |
| 20170306 | 3.16% | 2 | 10 | | 1 | | | |
| 20170307 | 0.02% | | 3 | | | | | |
| 20170308 | 1.04% | 3 | 5 | | | | | |
| 20170309 | 0.15% | 4 | 7 | | | | | |
| 20170310 | 2.69% | 2 | 2 | | 1 | | | |
| 20170311 | 2.39% | 4 | 4 | | 1 | | | |
| 20170312 | 0.24% | 2 | 3 | | 1 | | | |
| 20170313 | 0.20% | 2 | | | | | | |
| 20170314 | 0.01% | 2 | | | | | | |
| 20170315 | 0.01% | 2 | | | | | | |

Table 15: List of synthesis with an error overview of the missing percentages and errors for this reporting period

6. Scheduled activities for the next period(s)

- Software upgrades:
No software upgrades planned
- Hardware:
No hardware upgrades planned
- Development:
No developments are planned.
- No other activities scheduled.

7. Operational remarks

No operational remarks